The Mining Journal.

No. 483.] ENLARGED SHEET. [November 23.

West of England and South Wales Land Draining Company.

Capital £250,000, in shares of £25 each.

PROVISIONAL COMMITTEE.

All of whom have agreed to take shares.

The Right Honourable Lord Clinton, Heanton Satchville
Sir Thomas Dyke Acland, Bart., M.P. Killerton
Sir Ralph Lopes, Bart., M.P. Maristowe
William Porter, Esq. Hembury Fort
Clifford Shirreff, Esq. Howbeerhayne
John Dymond, Esq. Exeter
Edward Bradley, Esq. Tregoff-place, Glamorgan
The Right Hon. Lord Courtenay, M.P. Powderham Castle
Sir Charles Lemon, Bart., M.P. Carclew, Cornwall
Samuel Trehawke Kekewich, Esq. Peamore
William Nation, Esq. Exeter
Henry Ker Seymer, Esq. Hanford
George Pye, Esq. Exeter
Thomas Hooper, Esq. Waybrook, Exminster
(With power to add to their number).

PROVISIONAL TRUSTEES.

Montague Baker Bere, Esq. Exeter; the Rev. John Huyshe, Clist Hydon.

BANKERS.

The Exeter Bank; the City Bank, Exeter; the Devon and Cornwall Banking Co.

CONSULTING DRAINING ENGINEER.

Josiah Parkes, Esq.,

Consulting Engineer to the Royal Agricultural Society of England.

SOLICITOR—R. T. Head, Exeter.

SECRETARY—Thomas May, Mount Radford.

The object of this company is to afford to landowners and occupiers increased facilities for the draining of their land, by executing the necessary operations with the most suitable materials, in such manner as shall be deemed the most scientific, economical, and effectual, or by the advance of capital for such purpose—the cost incurred thereby, or the money advanced, to be re-paid by instalments.

The profits resulting from scientific draining are admitted by every agriculturist, but nevertheless both landlord and tenant are often deterred from draining, as well from the fear that it may be unskilfully performed, as that when extensively executed it is attended with a large immediate outlay of capital.

The Legislature, with the view of encouraging draining, has, by the Act of 3th and 4th Victoria, cap. 55, enabled the owners of settled estates to charge their lands with money laid out for that purpose.

It will be of primary consideration to obtain the assistance of the best practical and scientific drainers, and to adopt the most improved and economical modes of draining now in use, adding from time to time such improvements as extended practical experience may suggest, and procuring such tiles as are found in practice to be the best and cheapest.

In all instances, for the mere purpose of labour, the company will, as far as practicable, avail itself of the labourers of each respective neighbourhood.

The operations of the company, where called for, cannot fail to benefit both landlord and tenant, whilst the capitalist will readily see that such a company as this has in it little or nothing of the character of speculation; all its investments will be on land, or on operations connected with land, and be adequately secured thereon.

By the improved modes of manufacturing tiles (which, by the aid of the machines, can be made at one half the cost for which they are now sold within the probable sphere of the company's operations), as also by the skill which the large capital of the company can command, and the assured extensive call for its operations, it is estimated that a large profit will result to the shareholders, combined with equivalent advantages to the agricultural interest.

From the large tracts of land requiring draining, it may be assumed, that the instalments of capital, as re-paid, will be again profitably invested for a series of years.

The capital of the company will be called for only as required, and will be forthwith invested. If desirable, an application will be made for an Act of Parliament for incorporating and regulating the society, and for obtaining such privileges and immunities to shareholders as the Legislature will confer.

The capital of the company to be £250,000, in shares of £25 each; a deposit of £1 per share to be paid on the allotment of the shares.

The calls will be regulated by the demands made for the operations of the society, but none will exceed £2 10s. per share, nor be made until after two months' notice.

The management to be under a board of directors, elected by the subscribers.

The head office to be in Exeter, and the board to meet there on Thursday in every week; and agencies, if necessary, to be established in other parts of the country.

A general meeting of subscribers, to receive the statement of the company's affairs, to meet half-yearly, or oftener, on special notice.

Interest or dividends, after such rate as the board of directors may recommend, to be paid half yearly on the capital paid up, together with such further division of profits as, on a triennial statement of the company's affairs, the profits of the company will justify. The accounts to be made up and audited at a time to be fixed prior to the half yearly general meeting.

Above [illegible] have been received from landowners, many of them holding large properties in the districts, approving the objects of the company, and containing ample assurances that it will be fully employed as soon as it is prepared to commence operations.

Applications for shares or prospectuses to be addressed to Messrs. Mullens and Marshall, 1, Lombard street; to Messrs. Downes, Gamlen, and Scott, solicitors, 7, Furnival's Inn, London; also to Messrs. Cook and Mansford, solicitors, Bath; Edward Bradley, Esq. Tregoff Place, Glamorganshire; Henry Phelps Goode, Esq. Scotchwell, Pembrokeshire; George Goode, Esq. Croft, Carmarthenshire; Richard Austice, Esq., Bridgewater; and to Mr. R. T. Head, solicitor, Exeter.

FORM OF APPLICATION FOR SHARES.

To the Provisional Committee of the West of England and South Wales Land Draining Company.

I request that you will allot me shares of £25 each in the capital stock of the West of England and South Wales Land Draining Company, and I hereby undertake to pay a deposit of £1 per share on the shares allotted to me, and to execute the Deed of Settlement when required.

Name........................
Dated the day of 184 Residence........................

Cwmorthin Slate Company.

Capital £100,000, in 10,000 shares of £10 each.

Deposit £1 10s. per share.

PROVISIONAL COMMITTEE.

William Bodkwell, Esq., Southwark

Fred. Ramsden, Esq., Manchester	W. B. Chorley, Esq. Tremadoc
J. C. Ridge, Esq. ditto	Joseph Ashhead, Esq. Manchester.

(With power to add to their number).

SOLICITORS—Messrs. Key, Blunt, and Co. Lothbury

SECRETARY—Thomas A. Cottell, Esq.

This company is formed for working the Cwmorthin Quarry, about thirteen miles from Portmadoc, twenty five miles from Carnarvon, containing the same veins of slate as those of the most celebrated slate quarries in Merionethshire, and capable of being rendered one of the most extensive in that county.

The quarry has been fully proved, and worked to some extent—the nature of the metal has been efficiently tested, and found to be of a superior quality; it therefore only remains to raise capital sufficient to ensure the production commensurate to the extent, the return of which cannot fail to be highly remunerative.

The present tenants hold under a forty years' lease, and arrangements have been made whereby the fee simple can be bought upon most advantageous terms, on the acquisition of which the quarries might be worked without charge of royalty or any hindrance. In addition to the slate vein, the estate contains about 200 acres of land, available for various purposes connected with the works—while, for working the machinery (water and power) state, a fall of water supplies all the necessary power.

To carry out the objects of the company, it is proposed to raise £100,000, in 10,000 shares of £10 each, under the following regulations:—

A deposit of £1 10s. per share to be paid on allotment of the shares, for which a receipt will be given, exchangeable for the certificate of the company; and a further instalment of £2 per share in January, 1845, and £1 10s. per share payable in April.

No dividend to be declared for the space of two years from Nov. 1, 1844, but the shareholders to receive interest at the rate of £5 per cent. per annum upon the calls paid from the date of payment of each call.

The purchase of the leasehold and fee simple of the quarry, including the works, machinery, and stores on same, &c., may be estimated at £[illegible], to which add the further expenditure and outlay for three years, in further clearing and extending the works, £[illegible], with branch line of railway, cottages, materials, management, &c., £[illegible]—making a total of £[illegible].

After the first three years the quarry should produce about 10,000 tons per annum, with a profit of nearly [illegible] per ton, on the above outlay, which profit may be expected considerably to increase, as the quality of the slate improves the deeper the vein is worked.

Prospectuses, with further information, to be obtained from the secretary, at the company's offices, New Adelphi Chambers, to whom applications for shares should be made in the following form:—

I request you will allot to me shares, of £10 each, in the Cwmorthin Slate Company, and I hereby undertake to accept the same, or any less number allotted to me, to pay the deposit and all further calls duly made thereon, and to sign the company's Deed of Settlement when required.—Dated the day of 1844.

Name........................
Residence........................
Profession........................

Name, residence, and profession of a referee.

Just published, the Fourteenth Edition, price 2s. 6d.; free by post, 3s. 6d.,

The Silent Friend: a medical work, on Human Frailty,

Nervous Debility, constitutional weakness, [illegible], &c.; with Observations on Marriage, &c. By R. and L. PERRY and Co., surgeons, London. Published by the authors, and sold at their residence; also by Strange, 21, Paternoster-row; Hannay and Co., 63, Oxford street; Starie, 23, Tichborne street, Haymarket; [illegible], Leadenhall-street; Purkiss, Compton street, Soho, London.

The CORDIAL BALM of SYRIACUM is a stimulant and renovator in all spasmodic complaints. Nervous debility, indigestion, asthma, and consumption, are gradually and imperceptibly removed by its use, and the whole system restored to a healthy state of organization.—Sold in bottles, price 11s. each, [illegible].

PERRY'S PURIFYING SPECIFIC PILLS have long been used as the most effectual remedy for scorbutic eruptions of every description, [illegible] of the skin, pimples on the face, and other disagreeable affections, the result of an impure state of the blood. These pills are perfectly free from mercury, copaiva, and other deleterious drugs, and may be taken with safety without interference with or loss of time from business, and can be relied upon in every instance.—Sold in boxes, at 2s. 9d., 4s. 6d., and 11s., by all medicine vendors.

Messrs. Perry and Co. may be consulted at their residence, 19, Berners street, Oxford-street, daily, from eleven till two and five till eight.—On Sundays from ten till 2 o'c.

REGISTERED PROVISIONALLY.

Cornwall and Devon Central Railway, from Falmouth to Exeter.

Capital £1,500,000, in 60,000 shares of £25 each.

Deposit £1 5s. per share.

OFFICES—68, OLD BROAD-STREET, LONDON.

PROVISIONAL COMMITTEE.

Hon. John C. W. Vivian, M.P.
Captain J. H. Plumridge, R.N., M.P.
Sir Joseph Sawle Graves Sawle, Bart, Penrice
Lewis William Buck, Esq. M.P. Moreton
William Feilden, Esq. M.P.
Edmund Turner, Esq. M.P.

Directors of the South Western Railway Company.

Wm. James Chaplin, Esq. Chairman
Ambrose Humphrys, Esq. Dty Chairman
John Lewis Pyre, Esq.
Vincent Eyre, Esq.
Lieut.-Colonel Henderson
John Hilbert, Esq.
John King, Esq.
Thomas Smith, Esq.

Francis Mowatt, Esq. Deputy Chairman of the London and York Railway
Pascoe St. Leger Grenfell, Esq. director of the London and Birmingham Railway Company
W. A. H. Arundell, Esq. Lifton Park
T. R. Avery, Esq. Delabole, Boscastle
W. C. Beasley, Esq. Inner Temple
R. Gully Bennett, Esq. Tresillian House
George Stuckley Buck, Esq. Hartland Abbey
J. J. A. Boase, Esq. Penzance
George Braginton, Esq. Torrington
John Bull, Esq. Marlborough House, Falmouth
T. B. Chanter, Esq. Mayor of Bideford
Stephen Davey, Esq. Bochim
Richard Davey, Esq. Redruth
Henry J. Enthoven, Esq. Old Broad-st.
J. Fox, Esq. Tregedna, Falmouth
Edward Gard, Esq. Exeter
James Gould, Esq. Knapp, Bideford
Rev. J. L. Harding, Monkleigh
T. Gedde Harding, Esq. Monkleigh
Collan Harvey, Esq. Pengreep
Richard Harvey, Esq. St. Day
John Hill, Esq. Lieut. R.N., Falmouth
Dechie P. Hoblyn, Esq. Colquite, Bodmin
Joseph Hodge, Esq. Truro
H. J. Hooper, Esq. Penhargard, Bodmin
John S. Jago, Esq. Gorran
Trevenen James, Esq. Broad-street-buildings
J. P. Kennard, Esq. Lombard street
Henry Kendall, Esq. Austinfriars
Capt. G. B. Lawrance, R.N., Lostwithiel
James S. Ley, Esq. Durrant, Bideford
Edwin Ley, Esq. Penzance
James Ludgater, Esq. Bishopsteignton
James Oliver Mason, Esq. New Broad-st.
J. Masterman, jun. Esq. London
Hugh Mallet, Esq. Ash
Robert Michell, Esq. Truro
William Michell, Esq. M.D. Bodmin
Edward Michell, Esq. Truro
J. Parsons, Esq. Lieut. R.N., Falmouth
Richard Pearce, Esq. Penzance
J. P. Peters, Esq. Colquemarthen
Samuel Peters, Esq. Mayor of Penzance
F. H. Rodd, Esq. Trebartha Hall
Thos. Rosevear, Esq. Barn Park
Charles A. Reynolds, Esq. Trevenson House
W. E. Snow, Esq. Tredegar sq. London
Wm. Sleggett, Esq. Boscastle
M. C. [illegible], Esq. Park-place, Maida-hill, London
John Stilliant, Esq. Coombe
Commodore Sullivan, C.B., Mylor, Falmouth
W. Tardrew, Esq. Annery House, Devon
John Taylor, Esq. F.R.S. Duke-street, Adelphi, London
Rich. Taylor, Esq. Great Wood, Cornwall
R. E. Townshend, Esq. Doctors' Coms.
Charles W. Turner, Esq. Truro
Matthew Uzielli, Esq. London
C. K. Vigors, Esq. Truro
Humphry Willyams, Esq. Carnanton
John Morris Woollcombe, Esq. Ashbury, Devon
Major Wren, Lenwood, Bideford

(With power to add to their number).

ENGINEER—Joseph Locke, Esq. F.R.S.

RESIDENT ENGINEER—Richard Thomas, Esq.

BANKERS.

Messrs. Willyams, Hodge, and Co. Miners' Bank, Truro and Camborne
Messrs. Ricketts and Co., Truro, Penzance, Falmouth, and St. Columb
Messrs. Masterman and Co.; Sir J. Lubbock and Co.; Messrs. Denison, Heywood, Kennard, and Co., London

SOLICITORS—Messrs. T. and F. Edwards, Gray's Inn, and Messrs. Bircham and Dalrymple, Bedford row, London; Messrs. Bull and Tilly, Falmouth.

SECRETARY—Thomas Harvey, Esq. Falmouth.

This line will, in connection with the proposed railway from Salisbury to Exeter effect a saving of nearly fifty miles between Falmouth and London over the route by Plymouth, Exeter, and Bristol, and will be about ninety eight miles in length from Falmouth to Exeter; it will pass through the most populous and fertile portion of central Devon, by way of Crediton, Bow, Hatherleigh, and Okehampton, on to Newport by Launceston, and thence by Bodmin on to Truro and Falmouth, penetrating the centre of the great mining district of Cornwall.

It is approved by the landowners interested in the property intersected by it; it is beyond the reach of successful opposition—and in 1836 received the sanction of a Committee of the House of Commons.

Application for shares in the Cornwall and Devon Central Railway may be made to the secretary, to the solicitors, to Messrs. Easthope and Son, Lothbury; Messrs. Charles and Henry Hill, 18, Threadneedle street, or Richard Williams, Esq. 2, Duke-street, Adelphi, London; Messrs. Nelson, Liverpool; Mr. John Smith, sharebroker, Commercial buildings, Leeds; Thomas Sandford, Esq., Exeter; Mr. Hew. Wilson 8, Temple street, Birmingham; or to John Barnard Locke, Esq. Manchester;—from any of whom prospectuses may be obtained.

The committee will allot the shares to unexceptionable parties in the order in which the applications may be made; in all cases references will be required.

68, Old Broad street, London, Nov. 13, 1844.

FORM OF APPLICATION.

To the Provisional Committee of the Cornwall and Devon Central Railway Company.

GENTLEMEN,—I request you will allot to me shares, of £25 each, in the Cornwall and Devon Central Railway, on the terms and conditions of the prospectus, and I undertake to pay the deposit, and sign the subscribers' agreement and Parliamentary contract when called upon.—Dated the day of 1844.

Name........................
Residence........................
Trade or profession (if any)........................
Reference........................

Notice—Cornwall & Devon Central Railway.

—In consequence of the numerous applications for shares in this railway which have already been received, the SHARE LIST WILL BE CLOSED on the 27th inst., after which no further applications can be received; and the committee will at once proceed to allot the shares to unexceptionable parties, to whom notice of the allotment will be given. By order of the committee,

Committee Room, Nov. 18. THOMAS HARVEY, Secretary.

Cornwall and Devon Central Railway.—

The committee have the pleasure to announce, that the OBSERVATIONS OF TRAFFIC, taken for the committee appointed by the county of Cornwall in 1836, by Mr. Francis Fox, in connection with the attempt then made to carry out a Central Line of Railway, have, to a considerable extent, been REVISED by that gentleman, and the result is of the most satisfactory character, clearly showing that there is NO FALLING OFF in the GENERAL TRAFFIC of the counties of Devon and Cornwall since 1836, and that there is evidence of a large increase in some localities, which must beneficially affect the traffic of the Central Railway.

(Signed) RICHARD TAYLOR, Chairman.

Committee Room, Truro, Nov. 18.

Cornwall and Devon Central Railway.

Truro, November 16, 1844.

SIR,—The committee of the Devon and Cornwall Central Railway Company have instructed me to inform you, that no one connected with them has on any occasion stated that Frederick Ricketts, Esq., had given his personal support to the Devon and Cornwall Central Railway.

The only mention of Mr. Ricketts individually which has been made by any member of this committee was by myself, in addressing a public meeting of the inhabitants of the borough of Truro, held on the 18th of October, when I alluded to Mr. Ricketts's peculiar and delicate position, in order to guard against any misunderstanding which might arise from his being at the head of the firm who had tendered valuable assistance to the Cornwall and Devon Central Railway, in the following words:—

"The head of that firm, Mr. Ricketts, is no stranger, that no one can identify him individually with our interests; he is a director of the Great Western, chairman of the Bristol and Exeter, and on the Board of the South Devon Railway Company, and it is not to be expected that he should join us; but his firm came to us and said we will take a large interest in your company as a bona fide investment committee, and we will bring to you a party of capitalists in London, connected with us and our friends, who will be guarantees for a very large portion of your capital.

"I have this day received permission from a representative of that firm to say, that, in the course of a few days, as soon as he can communicate what has passed this morning, and get an answer, their names will appear on the provisional committee."

I am further directed to inform you, that the committee of the Cornwall and Devon Central Railway never have stated or implied that the banking firm in Cornwall, of which Mr. Ricketts is the head, has engaged to make a large advance of money to the Central Line, but that they have engaged to give it that degree of support which is described in the words above quoted as spoken by myself at Truro, of which a simple and plain proof is, that four of the five partners constituting that firm have joined the provisional committee of this company, and are actively and energetically engaged in promoting its success.

By the request of the committee,
(Signed) RICHARD TAYLOR,
Chairman of the Managing Committee.

J. B. Badham, Esq., Bristol and Exeter Railway Office, Broad street, Bristol.

Truro, November 18, 1844.

GENTLEMEN,—A statement having been published by Mr. Badham, by order of the Bristol and Exeter Railway Company, containing a misrepresentation of the connection existing between your firm and this company, accompanied by a letter from Frederick Ricketts, Esq., alluding to an unauthorised use of his name, I am desirous to inquire of you whether your statement, in connection with what was said by me at the meeting held at Truro, on the 18th of October, or elsewhere you are aware of any use of Mr. Ricketts's name, as implying that this company had obtained his personal support. I have the honour to be, &c.

(Signed) RICHARD TAYLOR,
Chairman of the Managing Committee.

Messrs. Ricketts, Enthoven, and Co., Truro.

Truro Bank, Truro, Nov. 18, 1844.

SIR,—We feel no difficulty in replying to your letter of this day's date. The statement made by you at the public meeting held in this town, as regards the support which a portion of our firm intended to afford to the Cornwall and Devon Central Railway Company, is substantially correct. We also beg to state that we are not aware, nor do we believe, that the committee have, on any occasion, stated that Mr. Ricketts, the head of our firm, had given his personal support or interest to the Central Line of Railway through Cornwall and Devon.

We are, Sir, your obedient servants,
(Signed) RICKETTS, ENTHOVEN, TURNER, MASON, and JAMES.

To Richard Taylor, Esq., Cornwall and Devon Central Railway Committee, Truro.

London and Birmingham Railway—Warwick

AND LEAMINGTON BRANCH RAILWAY.—NOTICE.—The OPENING of this RAILWAY for TRAFFIC is POSTPONED from Monday, the 2d, to Monday, the 9th December. By order, R. CREED, Secretary.

Office, Euston Station, Nov. 18.

Edinburgh, Leith, and Granton Railway.—

ESTIMATES WANTED.—The directors of the Edinburgh, Leith, and Granton Railway Company are now prepared to RECEIVE TENDERS for the EXECUTION of the WORK of the EDINBURGH TUNNEL, extending from the Canonmills Station of this railway to the Stations of the Edinburgh and Glasgow and North British Railways at Canal street, being in length 1000 yards or thereby.

A drift mine having been already carried through the whole extent of the tunnel, will greatly facilitate intending offerers in making up their estimates.

The plan, section, and specification of the work to be executed may be seen at the Railway Company's office here, from Monday, the 18th, to Saturday, the 30th current; and further particulars may be learned at the office of Messrs. Grainger and Miller, 6, Castle-street.

Sealed proposals, marked "Tender for Tunnel," will be received by the secretary until the evening of Wednesday, the 4th of December next.

By order of the directors,
A. G. FIELD, Secretary.

Railway Office, 32, Scotland street, Edinburgh, Nov. 1.

Great Southern and Western, or Direct

CORK AND LIMERICK RAILWAY.—(VIGNOLES'S LINE.)

The Parliamentary Notices having been inserted, and every preparation made to obtain an Act in the ensuing session, NOTICE is hereby given, that NO APPLICATION for SHARES in this company will be received after MONDAY, the 2d of December next.—All applications for shares for London in future to be made at the Company's Office, *Albion Chambers, Adam-street, Adelphi.*

Nov. 20. EDWARD BILLING, Sec.

Great Southern and Western, or Direct

CORK AND LIMERICK RAILWAY.

(VIGNOLES'S LINE.)

Cork and Bandon Railway, and Kilkenny

JUNCTION RAILWAY.

The OFFICES for these COMPANIES are REMOVED TO THE ALBION CHAMBERS, ADAM-STREET, ADELPHI, where all communications for the future are requested to be made.—Nov. 20. EDWARD BILLING, Sec.

Waterford and Kilkenny Railway.

Capital £250,000, in 12,500 shares of £20 each.

Deposit £1 per share.

COMMITTEE IN IRELAND.

The Most Noble the Marquis of ORMONDE, Chairman.
The Right Honourable the Earl of Desborough
The Right Honourable the Earl of Desart, D.L.
The Right Honourable the Visc. ount Duncannon
E. Smithwick, Esq. Mayor of Kilkenny
Thomas Meagher, Esq. Mayor of Waterford
W. M. Ardagh, Esq. Waterford
Wm. Ponsonby Barker, Esq., Kilcooley Abbey, county Tipperary
Sir H. W. Barron, Bart., M.P., D.L., Belmont House, Waterford
Hon. Colonel Butler, M.P. Ballyconra House, county Kilkenny
P. S. Butler, Esq., M.P. Lodge Park, Freshford
Colonel Bryan, D.L. Jenkinstown, Kilkenny
Dr. Cane, Alderman of Kilkenny
P. Connellan, Esq., D.L. Coolmore, Thomastown, county Kilkenny
Sydenham Davis, Esq. Thomastown
H. de Montmorency, Esq., D.L. Castlemorres, Knocktopher
W. F. Finn, Esq. Tullaroan, Kilkenny
W. H. Greene, Esq., Slun House, Kilkenny
W. Grace, Esq. Kilkenny
Sir R. Langrishe, Bart. Knocktopher
Sir F. Loftus, Bart. Mount Loftus, Goresbridge
John M'Creith, Esq. Kilkenny
W. [illegible], Esq. Waterford
T. Murphy, Esq. Waterford
John O'Connell, Esq., M.P. Dublin
Sir John Power, Bart., D.L. Kilfane, Thomastown, county Kilkenny
Harry Ryan, Esq. Kilfera, Kilkenny
C. B. Savage, Esq. Kilcreen House, Kilkenny
R. Sullivan, Esq., J.P. Kilkenny
M. Warren, Esq. Sandford's court, Kilkenny
Thomas Wyse, Esq., M.P. The Manor, Waterford

COMMITTEE IN LONDON.

George Anderson, Esq.
Charles Barry Baldwin, Esq., M.P., D.L.
Thomas Wentworth Beaumont, Esq.
Alfred Ricketts, Esq. Edmund Turner, Esq. M.P.

(With power to add to their number).

BANKERS.

The Bank of Ireland, the Provincial Bank of Ireland, the National Bank of Ireland, and their Branches.

CONSULTING ENGINEER—Captain W. S. Moorsom.

ACTING ENGINEER—John Valentine, Esq.

ARCHITECT—Charles Frederick Anderson, Esq.

SOLICITORS IN LONDON—Messrs. J. and F. Edwards, 3, South square, Gray's Inn.

SOLICITORS IN WATERFORD—Messrs. Elliott and Newport.

SOLICITOR IN KILKENNY—Harvey Devenant, Esq.

SECRETARY—W. Bridges, Esq.

The proposed line from Waterford to Kilkenny is thirty two English miles in length. The total cost, including outlay for stock, stations, &c., will not exceed £[illegible] per mile.

It will be perceived that the line is intended to meet the projected branch of the Great Western Railway from Gloucester to Fishguard (the South Wales line), and that it must necessarily command a great portion of the traffic from the West of England; and, if extended to Dublin, will constitute Waterford one of the most important ports of the empire.

Power will be taken for the further extension of the line to the Irish metropolis, in the event of such a measure being deemed advisable.

The port of Waterford can be entered at all times of the tide by vessels of 1000 tons. The export trade of Waterford and the traffic between Waterford and Kilkenny is considerable, and is on the increase.

The exports of Waterford in 1835, according to the Report of the Irish Railway Commissioners, amounted to the value of £[illegible], and the imports to £[illegible]. At present the exports are represented by the local authorities to exceed two millions, and the imports one million and a half.

At least one third of the exports from Waterford may be presumed to pass through the county of Kilkenny, and this traffic would necessarily require a great stimulus for the construction of a line of rapid communication with the interior of the country. The probability of a remunerative return from a railway opening up a communication between Waterford and Kilkenny, with a view to its future extension to Dublin, will be enhanced by the adoption of the economical principle upon which it has been determined to construct the line, which insures a return of at least [illegible] per cent. on the primary investment.

The necessary plans and surveys, with all other preliminary arrangements, will be ready, so as to apply to Parliament for a bill to incorporate the company early in the ensuing session; and interest at the rate of £[illegible] per cent. will be allowed to subscribers on their deposits until the railway is complete.

Subjoined is a statement of the present through traffic and probable profit:—

Coach traffic, four journeys a day, forty passengers, at 6s.	£[illegible]
Car traffic, four journeys, six days in the week, 100 passengers, at 3s. 6d.	[illegible]
Merchandise, 100,000 tons, coals included, at [illegible] per ton	[illegible]
	£[illegible]
Assuming an increase of only double the present traffic, we have	£[illegible]

showing a divisible profit, after deducting 40 per cent. for working expenses, of £[illegible], or nearly [illegible] per cent. on the capital.

No subscriber will be responsible for more than the amount of his share.

The prospectus and the form of application for shares may be had at the offices of the company, 3, Parliament street, Westminster, and 67, New Broad-street, London; of M. Sherman, Esq., Kilkenny; Messrs. Elliott and Newport, Waterford; Mr. F. Millar, broker, Edinburgh; and the company's bankers.

FORM OF APPLICATION.

To the Provisional Committee of the Waterford and Kilkenny Railway.

GENTLEMEN,—I hereby request you will appropriate me shares in the above proposed railway, and I engage to pay the deposit of £1 per share upon such allotment as you may be pleased to make, and to sign the subscription contract required by Parliament, and also the subscribers' agreement.

I am, Gentlemen, Your obedient servant,
Name........................
Profession, trade, or calling........................
Residence........................
Date of application........................ 184

Prosser's Patent Railway Guide Wheels.—

The proprietor of the above patent hereby gives notice, that he is prepared to GRANT LICENSES for the USE of these GUIDE WHEELS, on either works of iron rails, the advantages of these, in reducing the [illegible] by the [illegible] wheels, and consequent [illegible] of the wear and tear of engines and carriages, are equally applicable to iron rails as wooden ones. In the application of these to railways with wooden rails an immense saving is effected in the original cost, in addition to the economy in working the line. Further particulars, and terms on which licenses are granted, may be had on application at the company's offices, [illegible] street, London. [illegible], Secretary.

ON THE VENTILATION OF COAL MINES.

We have been favoured with the following copies of two letters, addressed by Mr. Mather (the secretary of the South Shields Committee) to Sir Robert Peel, and which, we understand, has been received in a particularly favourable manner by the right hon. baronet, who caused them to be handed to Drs. Lyell and Faraday, the Government Commissioners, to make inquiries and offer suggestions on the subject. We readily publish the communications, as we also shall those of any of our correspondents who may wish to remark on the statements they contain:—

HASWELL EXPLOSION, AND ACCIDENTS IN COAL MINES.

South Shields, Oct. 30.

SIR,—The dreadful explosion on the 28th September, at Haswell, which killed every human being (ninety-five in number) at that time in the mine, will, I trust, be a sufficient excuse, if excuse were wanting, for me (the Secretary of the South Shields Committee for the investigation of accidents in mines) in requesting your attention to two or three important points connected with that explosion, with a view to elucidate this subject, which calls aloud, in a voice no longer to be resisted, for legislative interference. In the *South Shields Report* (a copy of which I had the honour to transmit to you), the following general conclusions, amongst others, are thus stated:—

VENTILATION.—"When to this it is considered, that these explosions are always from a very limited portion of the mine, as at Wall's End, St. Hilda, Willington, &c., and that the air dwindles to a state of almost imperceptible motion, as we have seen, of not more than 1 1/10 feet, or three-quarters of a mile per hour, in the greatest part of the mine (especially those parts distant from the main streams), it is matter of surprise that these lamentable occurrences, instead of being occasional, are not incessant and overwhelming. Living thus always on the verge of destruction, it has excited amongst the officers and men of mines a continual watchfulness and knowledge of dangerous symptoms, that alone enable them to proceed with any degree of safety in such a situation, and in which, on the smallest error, or a contingency unforeseen, or incapable of being prevented—as a boy asleep or at play, a heated lamp, a broken wire, a sudden eruption of gas, or a change in the wind and pressure of the atmosphere—and the bounds of safety can no longer be preserved; but, tremblingly alive to their danger, as at Wall's End, they are plunged unresisting victims into the abyss. The committee are perfectly convinced, that with such a small force of ventilation as can be obtained by the present plan, and as in the north is commonly pursued, which the instance just detailed demonstrates, no human foresight or skill in its application can obviate these explosions; while this imperfect ventilation is allowed to continue, the mining districts and the public must prepare themselves for the continual occurrence of these dreadful calamities."—*Shields Report*, page 33.

SAFETY LAMPS.—"The committee find, after the most minute investigation, and careful attention and experiment, which they have been able to devote to this branch of their subject, that no mere safety lamp, however ingenious its construction, is able to secure fiery mines from explosion, and that a reliance upon it is a fatal error, conducive to those dreadful calamities which it is intended to prevent. The committee further find that the naked Davy lamp, without a complete shield of glass or other material, is a most dangerous instrument, and has indubitably been productive of those accidents in mines against which it is too confidently and generally employed, at the daily imminent risk of producing such calamity."—*Shields Report*, page 74.

As if by prophetic anticipation, you will perceive, produced only by an examination of the system and condition of the northern mines, and the instruments employed in them, and tracing striking and intelligible causes in operation to their natural and proximate effects, the Shields Committee have recorded their conviction, fearfully verified by the Haswell event, that such explosions must continue to prevail while the present system of ventilating the mines is allowed to exist. I now beg, not only to re-state that all our mines are prepared for these results, but that this very mine of Haswell, notwithstanding its vaunted condition, certainly not worse, but better, than many in the same field, is ready again to repeat the dreadful blow, and to doom numberless victims to a merciless slaughter, and scatter desolation in the bosoms of their helpless families. It is my duty, with your permission, to explain how this is an instance sustaining our views, and how these evils may be remedied.

The evidence adduced at the coroner's inquest was nearly all directed to show the extraordinary freedom from gas of the Haswell Mine, its unusual excellence of ventilation, and the perfect safety of the Davy lamp. These points, and the purport and value of the evidence, I will examine, as by them the subject will be most fully developed.

That very mine, which is called so safe, and free from gas, killed on the 17th August, 1841, two people by explosion of fire damp; and in Appendix (C) of the *Shields Report* it will be found, that 40,000 cubic feet of passages in this very pit were fouled to firing point by the same gas so far back as four years ago (1840), when the workings were at least one-third less than at present, and the same means of ventilation then existing as in 1844, showing that proportion of ventilation greater then for clearing the mine of gas than at the last explosion; and in this accident, so much gas was there in the mine, that a second explosion (or, at the least, a large accession of gas) took place, distant 200 yards from the original place of fire, at the Hambley whin goaf, as demonstrated in the marks of fire and direction of the fall of stoppings, thus proving, beyond a doubt, that explosive gas was in existence in large quantities at least in two different and distinct parts of the mine (see Wood's evidence). Although the reservoir, or goaf, of the second accumulation was not more than 1-15th as large as that of the original place of fire, yet it aids greatly in bringing to light a surcharged mine, wherever gas had an opportunity of harbouring and accumulating. That this accumulation could not be small, is evinced by the tremendous force of the explosion, which blew down almost all the stoppings and crossings, and killed a horse at the foot of the shaft, 1400 yards from the point of explosion at the Meadows Way goaf; yet it is declared the safest of pits—perfect in ventilation, entirely free from gas. Freely stated is this, notwithstanding the strong evidence of a mine abounding in carburetted hydrogen, as the striking display of its existence and abundance during the last four years testifies, as well as its too strong demonstration in this explosion; while their knowledge, not only of these facts, but of its existence, is shown by their working at Haswell (as in every fiery mine) the dangerous points by the light of the Davy lamp, the nearest naked light to the point of explosion and danger being stated to be upwards of 300 yards. A mine free of gas would not require these very careful precautions.

Large accumulations of carburetted hydrogen cannot fail to be collected from their plan here of working the coal, creating an unusual number of goaves. A "goaf," as it is called, is a space from which the coal has been extracted, when the roof falls down in masses, and the floor frequently rises, making a chaos of rocks and debris, the interstices of which are generally filled with gas, because it is difficult in such a place to remove it by ventilation. With these goaves in every district of this mine, of rich [illegible], there is, consequently a physical certainty of its existence; and there can scarcely be a doubt that at this very moment every goaf is extensively charged with gas, ready, on an accession from roof or thirl, or a material fall in the atmospheric pressure, to sweep over on the working points or the pillars. The former practice was, to work the whole coal to the extent of their boundary, and then to extract their pillars, leaving their goaf and danger behind them; now, the mode in some pits, as in this, is, to make the pillar working follow the whole coal of each separate district, or at once to remove the entire coal of each, forming goaves or separate reservoirs at various points in the mine, establishing them all around, before, behind, on the right and on the left, multiplying their magazines of fire in the most dangerous manner. This also, besides the difficulty of ventilation considerably greater, the former goaf requiring ventilation only on one side, while the latter requires it all around, [illegible] the dangerous contact of workmen and their lights; besides, in the [illegible] which the gas has [illegible] and gradually exhausted itself in [illegible], leaving less [illegible] to overcharge the goaf.

This [illegible] change [illegible] I will [illegible] the goaf, and being left to exhaust itself, as formerly, [illegible] and the pillar working [illegible] production, [illegible]

[illegible] you will probably [illegible] the

conclusion, that Haswell is neither a safe nor a well ventilated pit; and if, as asserted, one of the safest and best ventilated pits in the coal trade, then, that some great and important general change is imperatively required.

The viewer, in his evidence, admits, that in the Little Pit, where the explosion occurred, he had nearly 250 acres of workings, and that there is only one downcast shaft, twelve feet diameter, to supply with air not only the Little Pit, but the Engine Pit, too. This Engine Pit is presumed to be the greater pit, and is certainly of the same extent, at least, as the Little Pit—for we find on other evidence (Mr. Wood's) that it is thought necessary to supply its workings with a greater amount of air, the Little Pit having 37,038 cubic feet per minute, and the Engine Pit having 37,200—showing together an extent of 500 acres underground workings supplied with air by a *single twelve-feet shaft*, having for its area 109 square feet, which passed, when again brought into full operation, 74,238 cubic feet per minute.

On turning to the *Shields Report*, page 35, it will be found that for only 130 acres of workings at Wall's End Colliery, its late eminent viewer, Mr. Buddle, deemed it necessary to pass for its safety and purity upwards of 75,000 cubic feet per minute, which the Shields Committee, at their visit to that mine, ascertained, and by an official document from him to the committee two years ago, he stated it to be 75,976 cubic feet per minute, which the calculation verified. To produce these results, he had three downcast pits, one 8 ft. 9 in., and two six feet diameter each, giving a total area of upwards of 116 feet—so that Wall's End, with 130 acres, had more air than Haswell with 500 acres, showing a proportion of ventilation in favour of the former of nearly four to one. The fair inference from this is, that in the practical opinion of one of the acknowledged ablest viewers that the coal trade ever possessed, Haswell pit, *cateris paribus*, would have required three times more air for her safety than she had at the explosion. Although Wall's End pit was, doubtless, of a fiery nature, yet it has been shown that Haswell, though probably less so, may without injustice be included in the same category.

The attempt to impress Haswell with the character of a safe and well ventilated pit is, I presume, a sympathy with misfortune, or a desire to remove doubts of her suspected condition. This disposition has extended itself to another unfortunate pit, Coxlodge, at which life has been sacrificed by explosion on the 14th instant; and, at the coroner's inquest, I observe that this pit was also stated to be in excellent condition as to ventilation, and one of the safest of pits. I presume, if the whole series of the northern mines were to explode, we should have eulogy rising in proportion to the extent of the "accidents." Haswell Mine, having only one downcast pit of twelve feet diameter for supplying air, drawing coals, &c., for 500 acres of working, extending, I will venture to say, to thirty or forty miles, passages and galleries placed nearly 1000 feet below the surface, and having only one upcast pit, of nine and a half feet diameter, seventy feet area, for discharging that air and the collected gases, cannot but be in a position precisely fitted in some of her numerous recesses, which the limited supply of air cannot sweep, for generating and accumulating the abundant explosive gases of the coal mines, which gases, on a little accession by a fall of roof, or the atmospheric pressure, or from a blower press from their lurking places, with increased force on the usual lights of the mine, and explode. A mere rush of air through leading passages, leaving large recesses untouched, which so great an area and so small an original force of air must, cannot make a mine well ventilated and safe—on the contrary, when the original stream is split into smaller streams, and these again diffused over the extensive spaces in the galleries and passages, the motion of the air becomes almost imperceptible, and only gives life to the danger, instead of safety to the miner, supplying oxygen to the carburetted hydrogen, and creating the explosive mixture that produces these calamities.

It might with more truth be said, that the cellar, attic, or any room being a *cul de sac* of a large mansion, was well ventilated by a rush of air through the main passage and staircase—or rather, perhaps, a more correct proportion, in comparison of a twelve feet shaft to 500 acres, would be, a ventilation through the keyhole of the main door. It could not be called either healthy or safe, though no noxious or explosive gases, as these in coal mines, were generated within it. The advantage of the full extent of the area of the downcast at Haswell is further limited by eight or ten feet, which the tubs and their slides for drawing coals in this shaft occupy, reducing so much their limited supply of air at its source; again throttled and checked at its exit in the upcast of only nine and a half feet diameter, although the air has been expanded by the heat of the workings and furnaces upwards of one-seventh, necessarily requiring not a less, but a greater, capacity of shaft for its exit.

As a proof that it is for want of a full supply of air circulating through every portion of the mine that these explosions occur, I may name, that of late years they have taken place in the deep seated parts of the workings, or when the air had fallen short, leaving them scarcely with any ventilation at all, or just so much as prepared the combustible. For instance, at St. Hilda explosion, in June, 1839, in which thirty-two lives were lost—at Willington, in 1841, in which thirty-two—in August of the same year, at Thornley, at which nine—at King Pit, in 1843, in which twenty-eight—and now, I will add, at Haswell, in September, 1844, in which ninety-five lives were thus destroyed. There is no evidence to prove, or was attempted to be adduced at the late inquest—a matter of vast importance—that a current of ventilation swept, or could under the existing arrangements be brought to sweep, the workings of the broken around the goaf—the dangerous part, where this latter explosion occurred—but only that the air was strong in the chief air passages; so it might, and the interior of the mine be lying a mighty stagnant reservoir of explosive gases, ready to start into instant destructive action by natural or artificial causes, frequently occurring or easily produced.

Practical men agree almost unanimously on the necessity of an abundant supply of air, but they differ very widely on the necessity of a sufficient means of effecting it. In Cornwall, Staffordshire, and some other mining districts, where many of the mines are as deep as Haswell, and some of them deeper, as in the metallic mines of the former, they sink shafts for safe and healthy ventilation not more than 300 yards apart, ventilating with one shaft not more than twenty or thirty acres, while here at Haswell in a dangerous mine, nearly a dozen miles to the extent of her bounds, having 500 acres of workings, with only one downcast and one ill proportioned upcast for the safe and healthy ventilation of the whole. Can it be wondered that, under such circumstances, miners are an unhealthy and [illegible] class of men, or that their brief existence is often abruptly and miserably cut short by such fearful catastrophes as at Haswell; and yet it is quite true that Haswell is about one of the best, though not the best, ventilated and regulated mines of the north. One of the proprietors I know to be a man of much practical and scientific knowledge, which is applied, doubtless, to the best advantage of the mine; but if such be the system which is so fatal in its operations in one of the best mines under experienced management, it may easily be conceived what extent of depopulation, and destruction of life, frequently in masses, and oftener in detail, is produced in the worst ventilated mines on the same system. While mining operations thus pursued are allowed to continue, we must be prepared for a continual recurrence of these calamities, and at this moment the combustible is preparing, and the arrangements are making, for more human sacrifices. Attempts have been properly made to arrest by legislation the accidents on railways, which are comparatively few, and the loss appalling than those of mines; and, notwithstanding the officers and proprietors of railways were clearly satisfied that their works and system of operations were perfect, and in the best possible condition, which, at the inquests, have been naturally well made out by them and their workmen—yet has the legislature been pleased to persevere, and juries have condemned, because unfounded and disinterested evidence has been able to be adduced, [illegible] by their own sense and understanding. If legislation be necessary in a process so simple as that of railway travelling, and the well understood visible mechanical force employed, how much more is it necessary in the vast, dangerous, and complicated processes of coal mining, with its national [illegible], where the combination of noxious and explosive gases, with ill-applied mechanical and scientific skill, produce injury to health and loss of life to a most pitiable extent. Yet are these things left unchecked and undirected in the hands of capitalists and contractors, bound chiefly on their object of speculation, their proceedings buried in the darkness of the mine, beyond the investigation of the public and the legislature, who are now and then startled when the presence, below their hearth [?] [illegible] from the disorder into which they have entered [illegible]. However disposed the kind-hearted amongst the owners and viewers of mines may be to make beneficial changes, the pressure of competition between [illegible] same system with them all, and cheap [illegible] first [illegible] in the principle. That this limit is frequently passed is not to be wondered at, though there can be no doubt that a wise, safe, and comprehensive system, equally affecting all, would, in the end, become cheaper and more productive. If the mines be allowed to continue much longer in their present condition, there is reason to fear a general disinclination amongst miners for their present employment, and certainly a decided repugnance so to expose their children, to the detriment of a free supply of labour to the mines. A wise legislation will probably anticipate these evils. On the subject of the *Davy lamp* employed, the following brief statement of facts will clearly demonstrate it a most dangerous instrument for mines:—That before a committee of the House of Commons, in 1835, it was clearly shown by Birkbeck, Gurney, Murray, Pereira, and other scientific men, that explosive mixtures in motion will certainly pass the flame through the gauze of a Davy lamp (see evidence 9, 2941, 2943, 3217, 3218, 3883, 3889, 4197, 4198, and 4200), and that Dr. Pereira did absolutely, before the same committee then sitting, pass again and again the flame through the meshes of a wire gauze lamp of 1024 apertures to the square inch, which is infinitely safer than that of the common Davy lamp employed in mines, which has only 784 apertures to the square inch; because, in proportion as the apertures are diminished, so is the gauze less permeable to flame; and that also facts were verified before that committee, in which the Davy lamp had been productive of fatal explosion in practice (evidence 2558, 2735, 2736, 2737, 3428, 3429, 3492, and 3503). That the Belgic Government Commission, which was four years inquiring into the subject, discarded the Davy lamp for a safer principle originated in England, and which the Shields Committee, in their *Report*, first developed (pages 18 and 19), and that they sustain their views by facts and evidence, it must be admitted, altogether incontrovertible. That the Davy lamp has been admitted by its great discoverer to originate explosions, under certain contingencies, as explosive mixtures in motion (Parliamentary evidence, 2226, and Davy's *Researches on Flame*, vol. vi., p. 103), and that there are those favourable contingencies for passing the flame perpetually occurring in coal mines. That in addition there have been since discovered as constituents of gases of mines, olefiant gas, by Professor Bischof, of Bonn, and sulphuretted hydrogen supplied by the iron pyrites in great abundance in the northern mines (*Shields Report*, pages 9 and 10, 12 to 28), both of which gases ignite at the lowest red heat of metal—and, consequently, at the gauze of a heated Davy lamp will bring on a general explosion. I will take leave to cite the accident at Haswell, as another instance of explosion produced by the Davy lamp. The circumstances were—the explosive mixture was first prepared in the goaf from the small current of air carried through it, and to the pillar working, the Davy lamp being employed, and only that for light. A fall of roof occurred at the jud near which the men were working by the light of their Davy lamps; the fall was about six yards by three on the confines of the goaf, or gas reservoir, bringing down probably twelve or fifteen tons of rock and shale. The velocity of this fall would propel the surcharged air, which at the moment it is likely gained an accession of gas, with much force in the direction of the men in the passage where was its freed exit, passing thus the flame through the gauze cylinder of a lamp, which probably had first become heated by the action of the gas. Although four lamps were produced at the inquest, bent by evident mechanical force, yet there was no rupture in the gauze of a single lamp that could be detected which would admit a passage of the flame. The mere deviation of the cylinder from the perpendicular, I submit, would not have affected its security from so elastic a body as inflammable gas, had not the contingency of the danger by rapid motion been brought into operation; besides, three of these four bent lamps were found at a great distance, one of them nearly 200 yards from the point whence originated the explosion, and one only in the sixth headway course where it commenced (Chilton and Scott's evidence at the inquest), showing the injuries to them subsequent, and not previous, to the explosion, where the lamps had been projected against the sides of the passages and falls of the roof, as is usual, had been produced by the concussion.

Thus, then, have we clearly traced, by a series of authenticated facts and evidence, the Haswell calamity to imperfect ventilation, operated on by an instrument which developes its dangerous qualities with most facility in the mines, and we have shown that the system pursued of supplying this mine with air, and commonly practised in all the others of the north, will continue, while it is allowed to prevail, the perpetual source of destruction to the health and lives of the miners.

I respectfully submit, that a case has been made out for the best consideration of a wise and paternal Government and legislature, with a view to some practical measure for arresting these dreadful evils. What that measure should be, it would be presumption on my part to attempt to anticipate; but, doubtless, it would be such as to remove the source of these evils, by compelling the sinking of pits in a certain proportion to the extent of underground workings, not leaving hundreds of acres ventilated by a single shaft, which they would, doubtless, provide should be enforced by some official inspector, as of railways. Such a measure, carefully adjusted to the great individual interests involved, and combined with registration, and the scientific education of officers of mines, would cause the mines of Britain to approximate to the safe, skilful, and scientific condition of the other great interests of this enlightened country. As they now are, they are an opprobrium to her intelligence, her humanity, and fostering care. With an apology for so long occupying time and thought so important as your own, and which this generally ill-understood subject could alone in any manner excuse; but moved chiefly thereunto by your position, and the kindly interest you have been pleased to express in it, conjoined with an imperative sense of my own public duty, I have the honour to be, Sir, most respectfully, Your obedient humble servant,

JAMES MATHER.

The Right Hon. Sir Robert Peel, Bart., M.P., London.

South Shields, Nov. 11.

SIR,—In my communication of the 30th October, which I had the honour to transmit to you, on the subject of the Haswell explosion, it is stated, that there was no rupture of the gauze detected in any of the Davy lamps produced at the inquest. In making that statement, I was guided by the enclosed published account of the explosion, which was circulated as an official document from the Coal Trade Office at Newcastle.

It will be found in the introductory matter (page 3), that the explosion was imputed to the gauze passing the flame; and on the last day's inquest four lamps were produced, which I saw on the table of the inquest room, bent in their gauzes, and which were stated to have been found in the separate and distant localities referred to in my communication; and while I was in the room nothing transpired, or in the officially published account of the evidence, nothing is stated to show them to have been ruptured in their gauzes, which throughout contains that they were merely bent. I have, however, learned to-day, from a party who himself professed to have observed them, that there were fractures in some of these lamps. I add this account, unsustained as it is by any official evidence, that, if possible, no inaccuracy or misapprehension of facts or evidence may exist in my communication. But, even admitting this private statement as fact, the reasoning deduced from the localities in which the lamps were found (according to Chilton and Scott), and the other circumstances, confirm the probability of the explosion having created such injuries, instead of being created by them; or how explosion by one lamp, 200 yards and upwards from the explosion, being in the same condition as to injury as the lamp found in the exact point of explosion. Nor does it render less certain, that this fragile instrument, either from a slight fall, ever occurring from the roof, or by passing the flame through the gauze, is not a most dangerous instrument for mines. The only safe remedy still continues to consist itself into full and free ventilation.

I feel it to be my duty to add this note, and to transmit it to yourself, notwithstanding you were pleased to remit my communication to the Home Secretary, for the Government Commissioners, and I have the honour to remain, Sir, most respectfully, Your obedient humble servant,

JAMES MATHER.

The Right Hon. Sir Robert Peel, Bart., M.P., London.

CURIOUS EXPERIMENT IN OPTICS.—It is known that tartaric acid exercises a rotatory power over light, and imparts to it its colour combinations; paratartaric acid, on the contrary, although of the same [illegible] composition, does not possess this property. M. Mitscherlich, a Prussian chemist, has examined whether this would be the case under circumstances in which the two bodies would be similar, not only in their chemical composition, but in their crystalline form and their physical properties; the result has confirmed the established principle; and thus (says M. Mitscherlich) we have two bodies, in which the nature and number of the atoms, their arrangement and their distances, are the same, and which are, nevertheless, distinguished by different optical properties.

THE TRUE CAUSES OF THE SUDDEN DISSOLUTION OF THE DIRECT LONDON, MANCHESTER, AND YORK (and Bedford) RAILWAY COMPANY.

BY THOMAS MULOCK, ESQ., SECRETARY.

The prospectus of the above undertaking, with its long list of approving names, having been advertised, with my humble name attached as the registered secretary, appointed by the provisional committee, I respectfully request a portion of your space, in order to enable me to submit to the public a clear, candid, and dispassionate recital of the circumstances which led to the abrupt and unexplained dissolution of a regularly constituted company, within seven days after its published organization. In offering to your readers the present exposition, I have no private interests or feelings to serve or gratify; I am simply desirous of discharging what I conceive to be a public duty, by fearlessly indicating the unsound and perilously unsafe position of public companies in this great country, by reason of the false, and even practically fraudulent foundation on which very many of them rest. Scores of statutes, designed to crush the corrupt practices of bubble companies, may proceed from the well meaning mind of Mr. Gladstone and other legislators; but I venture boldly to assert, that the explanation I am about to afford will throw more light upon the real cause of evil than all the penal provisions that could be devised by a first-class train of railway lawyers. But, at once to our subject.

In the month of April last, Mr. George Remington, civil engineer, applied to me to aid him in bringing before the public a plan of direct independent railway communication between London and Manchester, and I was immediately impressed with the soundness and feasibility of his scheme. Manchester is unquestionably the most important provincial town in Great Britain—possessing an immense industrial population, put in activity by real capitalists, commanding vast resources, and who require the cheapest and speediest communication with the metropolis, in order to carry out their gigantic commercial operations; nevertheless, when railway routes from London to the north western parts of England were submitted to Parliament, the mercantile magnitude of Manchester was strangely overlooked, and, instead of considering that wonderful manufacturing metropolis as the proper and natural *terminus* of a direct line from London, Manchester became eventually tributary to three railway companies, and, of course, exposed to all the exactions and imperfect accommodation which are now fruitlessly denounced and deplored. I discerned, therefore, what the Manchester men (as they bluntly and honestly style themselves) now are fully and clearly, that Mr. Remington's plan of a direct line between London and Manchester would be, if effected, an inestimable boon to the interchanged interests of the great traders in these all-important termini, and I did not hesitate to give the scheme such publicity as I had the power of accomplishing. Finding that the town of Bedford was emphatically denoted on Mr. Remington's plan as being the true point of divergence if a line to York should also be contemplated, I repaired to the former town, without a single available introduction, but relying confidently upon the essential excellence and practical advantages of the scheme which I had undertaken to advocate. The result justified my anticipations. Through the zeal of Mr. Livius, Mr. Rogers, Mr. Skene, and other valuable coadjutors, a requisition was set on foot, the Mayor's compliance was obtained, and the largest public meeting (as I am informed) ever held in Bedford sanctioned almost by acclamation the principle contained in the following resolution:—"Resolved, That this meeting earnestly and confidently concurs in the proposition, that a line of railway from London, approximating closely to the town of Bedford, and diverging therefrom to Manchester and York, according to the specifications furnished by Mr. George Remington, is, of all existing projects of railway communication with Manchester and York respectively, the one which would most closely conduce to the interests of the town of Bedford, coupling the same with the interests of the community at large—Bedford, from its peculiar position, commanding an extent of water communication by means of the River Ouse, which, when turned to still better account by the approach of a great railway line, would, in all reasonable probability, much promote the prosperity of Bedford and its vicinity."

Fortified by this declaratory approval of the general tenour of our scheme, I conferred, on my return to London, with parties decidedly favourable to a direct railway from London to Manchester, *viâ* Bedford, and who also concurred in the conviction, that, assuming the success of such a line, a diverging line to York formed a noble national feature of the entire plan, and that a two-fold line, wisely carried out, would be in the highest degree desirable. Amongst the persons whom I consulted was Mr. Sherman, the spirited proprietor of the Hall and Mouth, who gave me much valuable information, and who, with laudable disinterestedness, afforded the use of his spacious rooms for a meeting convened for the discussion of this railway project. Notwithstanding the extensive communication of our intended meeting, and its objects by circular, it was found impracticable to draw the London traders out of their counting and warehouses; two or three gentlemen of commercial note did certainly attend, but they took no cordial or efficient part in the proceedings—in short, it was plain to my perceptions, that the mercantile men who would profit most by direct railway communication with Manchester were the most unlikely parties to promote it, if they were called upon to sacrifice (as they would deem it) an hour of their time, or a sovereign of their money. Subsequent events have amply attested the correctness of my conclusions. At this meeting it was, however, resolved to constitute a small committee, with the view of giving increased publicity to the project, and enlisting friends in what we conceived to be a good and creditable cause. Whilst endeavouring to ascertain the feeling of the London traders with Manchester, we were stopped by Mr. Dillon, the partner in a well known colonial establishment in Fenchurch-street, renowned for metamorphosing capitalists into Members of Parliament. Mr. Dillon was pleased to patronize a direct railway to Manchester; but he seemed on that all prospect of success was out of the question, unless we should be so happy as to secure the services of his brother-in-law, Mr. Ashurst, a clever city solicitor, and the legal oracle of the leading Manchester houses in all their tribulations concerning bad bills and calico contracts. With every willingness to receive Mr. Dillon's recommendation, I must confess that I did not see the necessary connexion between the success of a great national project and the professional services of a London attorney; but, as my friends and myself offered no objection, Mr. Ashurst was at once associated with Messrs. Clowes and Wollaston, as solicitors to the undertaking. In an early interview with Mr. Ashurst, I found him a man of intelligence, but utterly unacquainted with railway matters, and I foresaw that his unavoidable attention to the details of his own business would disable him from devoting his time and talents to the promotion of our scheme. Three months did Mr. Ashurst consume in appointments and disappointments, and the result of his strenuous industry was, a list of approvers of the project, sixty-nine in number, whose declaration, strange to say, was obtained by means of a guarantee from Mr. Ashurst, pledging himself, that the parties who expressed an opinion in favour of a London and Manchester Railway should be free from responsibility! I thought this promotion somewhat odd, but I set it down to a lawyer's contrivance for hoodwinking country clients, and I awaited the day when Mr. Ashurst would turn his lad to account; but I waited in vain—for Mr. Ashurst was exalted to the post of Under Sheriff of London, and his civic glories rendered him incomparable to all mention of a Manchester Railway. He was pliant in every way; he was told that if he would work, we would work for him; that every day was precious, from the long necessity for proceeding to comply with the Standing Orders of Parliament; that surveys must be completed, and (will shame appeal to a lawyer's ear?) that legal actions must be served, and all the profitable machinery of his profession promptly gone through.

We commenced ineffectually, and at length, on the 8th October, the committee determined (after shortly commencing) to act as if Mr. Ashurst were practising in Australia. Our first step was, to obtain the signature of the London Manchester houses to the following declaration:—

"We, whose names are hereunto annexed, desire to signify our strong approval of the principle of promoting a direct railway communication between London and Manchester, being convinced that every suggested railway scheme short of a great trunk line, which would rapidly and cheaply connect the metropolis with Manchester, will prove inadequate, furthermore, that the existing provisional projects will only serve to support a gigantic monopoly. We cordially concur in submitting a railway plan which will place London and Manchester within five hours' transit, which will materially reduce the cost of passenger and goods traffic, and which will afford facilities for conveyance through a long tract of rich and populous country, the distribution of the paramount advantages of railway accommodation."

The foregoing declaration (without the mysterious accompaniment of a guarantee) was immediately signed by a great number of London houses, and, as we were urgently pressed for time, in consequence of Mr. Ashurst's unaccountable delays, I consented to repair to Manchester, to procure there additional signatures of approval. I was the bearer of upwards of forty letters of introduction to Manchester, all proceeding from the zeal and kindness of Mr. Shepperson, of Cheapside, to whom personally I felt and feel exceedingly obliged. Accredited by such a recommendation, and accompanied alternately by Mr. Wilson and Mr. Cobbett (respectable solicitors in Manchester), I called on upwards of 200 commercial houses, and received 176 approving signatures in about nine days. I was, upon the whole, much pleased with the mercantile men of Manchester; they seem to me to be an honest race of manly money-getters, thrifty as traders, but liberal as citizens, and, if they love gain, they toil it openly, not covering over selfishness with a cloak of spurious religion. I advised them not to sign unless they understood the benefits of the scheme, and they had the good sense to appreciate my straightforwardness.

During my absence from London, every exertion was made to procure out of the list of London approvers the names of persons to add to our small provisional committee, and to all appearance Mr. Shepperson's efforts in this behalf were crowned with complete success. On my arrival in London on Saturday night, the 26 instant, I saw the prospectus in the *Times* newspaper, headed by a provisional committee, nineteen members of which belonged to eminent Manchester houses. "All right (thought I, in my simplicity): here are the very men, whose peculiar interests and habits, whose reputed wealth, respectability, and influence, as Manchester traders, qualify them to become benefactors to Manchester, by promoting direct railway communication with that capital of the cotton world." On assuming my functions as secretary, I saw that a meeting of the committee had been summoned for the next Tuesday, the 4th instant, in order to receive statements from the engineer and solicitors as to the amount of funds which would be required to complete the surveys and legal notices within the time fixed by Parliament, so as to enable the inceptive company to apply for a bill. At the appointed meeting of Tuesday, the required reports were made by the engineer and solicitors, and the general result was, that 12,000*l.* were wanted for preliminary expenses, to be raised in anticipation of deposits payable on the allotment of shares. If that sum were guaranteed on the next ensuing Thursday, and a payment of 2000*l.* made to him in advance, the engineer pledged himself to a compliance with the Standing Orders of Parliament. On entering into the discussion of this subject, it was observed, that of the whole committee summoned only nine persons were present, and now took place the (to me, at least) startling disclosure of the circumstances under which eighteen gentlemen had been induced to form the major part of the committee. They had consented to let their names go forth to the public as provisional managers of a great public undertaking, involving vast contingent interests, upon the distinct understanding *that they were not to be expected to give any attendance, or to take shares, or to contribute a farthing towards any preliminary expenses!* Upon hearing the avowal of this arrangement, I took the liberty to affirm, that it was wholly illegal and inoperative, and that no company could be safe or prosperous where so false a principle prevailed, as that gentlemen should give the sanction of their names to proceedings over which they were resolved to exercise no interference or salutary control. Moreover, I maintained that, according to the undoubted law of the land, parties who had allowed their names to be added to a committee, and who received due and formal notice of meetings thereof, and declined to attend, were beyond all question bound by the acts of those who should regularly attend, notwithstanding any private pledge given to the absentees for the use of their names. The more respectable and influential those names were, the greater would be the danger of the public in case a clique of unworthy persons should statedly act for a company whose affairs were wholly neglected by the really responsible, because the wealthiest, members of the committee. It seemed to me to be as preposterous for a London merchant to give his name to swell a committee, and yet stipulate privately for exemption from all public duty and responsibility, as for him to accept or endorse a bill, and then inform the holder that he never meant to pay it!—in point of fact, this flagrant error pervades all companies concocted by mere adventurers, who canvass for decoy committees; and as the present railway project originated in honourable views of public utility, I deeply lamented that the very same root of rottenness which had cankered other companies, should have been unwittingly introduced into our upright scheme. In order, however, to qualify, if not wholly to rectify, this fundamental error, it was proposed and carried, that no proceedings involving any responsibility should be presently taken, but that a circular should be issued by the secretary, convening a special meeting of the whole committee for the next ensuing Friday, "for the purpose of sanctioning the appointment of a sub-committee, to whom authority should be confided to carry out immediate and urgent objects."

On Wednesday and Thursday, it became clear to my mind, that the required compliance with the Standing Orders of Parliament was all but impracticable, and I appealed so effectually to the good sense and good feeling of Mr. Remington, as to elicit from him an assurance, that he would not pledge himself to the committee to complete the survey in the required period. In the mean while, rumours were rife and true, that the eighteen mercantile magnates who had conditioned to be mere of was on the provisional committee were panic-stricken on finding themselves substantial and responsible associates of a joint-stock company—and, albeit, more conversant with fustian than with Shakspere, they were ready to say with Macbeth, "We will proceed no further in this business;" and the way of escape which was devised and executed by these cautious gentlemen now remains to be told.

On the appointed Friday, the attendance of the committee again limited itself to the ominous number, nine, of which eight were members of Manchester houses; the ninth was Mr. Hamer, of the General Post-office—a man of judgment and probity, who had given his valuable aid to the project upon public grounds. Before proceeding to other business, I called the attention of the committee to letters received by me from five of their members—viz., Mr. Dear, Mr. Deves, Mr. Jones, Mr. Cowper, and Mr. Deacon—tendering their respective resignations. I ventured to suggest that their resignations should be accepted, and their names formally removed (if possible) from the registry—but a very different course was adopted by the majority of the meeting. A string of resolutions was brought forward by Mr. Shepperson, of which I briefly give the substance, by saying that at "one fell swoop" the whole scheme was repudiated, and the committee declared to be dissolved! I took the liberty of earnestly deprecating this rash resolution, and pointed out the responsibilities (not pecuniary, for none such to any amount had been incurred, and not one of the resolutionists, save Mr. Shepperson, had subscribed a single sixpence), but the moral, and even legal, responsibilities incurred by parties who had gone before the public as the ostensible upholsterers of a scheme which had already been expounded to in the shape of applications for many thousands of shares. I told them that, as men of commercial reputation, they could not properly dissolve their committee, without ordering their resolutions to be published, and taking every requisite step which should bring the frustrated undertaking to an honorable close. I had the hardihood to warn them of the certain consequences of their precipitate proceedings; and, on the termination of my monitory remarks, they were pleased to vote away their own reality, and amongst the voters were gentlemen who had previously resigned. The lawyers went upon the point of the legality of these suicidal votes—I content myself with asserting the presumptive *fiats* do so. Now, the lesson which I trust will be taught by this catastrophe is plainly this—that it is a mistake of folly and fraud for men of standing in society to lend their names to undertakings which they do not mean to watch over and support. If the scheme be bad, it is impertinent to afford it early countenance—if the project be sound, it is wise and just to uphold and nurture it. Our eighteen mercantile magnates should have considered that public undertakings should be sustained by some little infusion of public principle, and that men who give their names and nothing else are guilty of great deception towards the unsuspicious portion of the public. It is easy to talk of solicitors' jobs in getting up railway schemes, but the pillars of probity are the tools or sordid paramours who bargain for the use of their name-offices to the vice of a prospectus, and yet behave as even no more shame on important undertakings which they seriously promote than they do about the philosopher's stone. Let, therefore, all applicants for aliases to men of old commercial credibility inquire into the constitution of associations, provisional or otherwise. Do not be deluded by the notion that a commercial shopkeeper, blinded into a huge capitalist, must necessarily be a fit member of a committee for working out a public undertaking—on the contrary, his selfish devotedness to his own business and amassing fancy may render him more dangerously selected from the swell mob, because the unsuspecting public are decoyed into investments by the well-known wealth of some individual who shirks his proper public responsibility. Laws can do but little towards the correction of this crying evil. How can the registration of joint-stock companies prevent the formation of sham committees—that is, committees composed of opulent and reputedly honourable men, but who covenant, before their names flourish in the advertising columns of the *Times*, that they shall not be called upon to perform a single act befitting the responsible function which they so rashly assume? I feel, however, very happy that I have escaped the embarrassment of a counterfeit committee, which would have marred the prosecution of one of the best railway projects in this country—a project which, if espoused by real supporters, would prove a national benefit.—*London, Nov. 20, 1844.*

METHODS OF TRACTION ON RAILWAYS.

ATMOSPHERIC PRESSURE, TENSION OF A ROPE, LOCOMOTIVE-ENGINES.

There are four general methods of traction practised on railroads where steam is the motive power:—1. By means of a rope passing over and wound up by a drum, which revolves by the action of the engine.—2. By means of a tube extending the whole length of the railway, and containing a solid piston, which is forced along by the air being pumped out of the tube by an engine stationed at one end of it.—3. By hydraulic pressure.—4. By means of a locomotive-engine which turns the wheels on which it rests, and by the friction of these with the rails, carries the attached train forward. In each of these methods of transferring the power of the engine, a part of the power is lost in the transference.

1. In traction by a rope, some part of the power will be absorbed by the friction of the rope with the road, or with the friction wheels on which it is laid. Also, the parts of the rope between each two friction wheels will hang down in a curve; force will be expended in raising and straightening these segments of the rope before the train can be put in motion. Moreover, if the rope possess elasticity, the engine must first stretch the rope to a certain extent before it can act on the train. It must be considered also that the engine starts not only the train itself, but also with equal rapidity a heavy rope equal in length to twice the distance between the two railway stations. These causes would operate were the trains to move on rails perfectly even, but in practice obstacles occur at the joints of the rails and elsewhere which communicate shocks to the train in motion. Hence will arise another abstraction of power; for at each shock the train will be slightly retarded, and then again accelerated, and consequently a vibrating motion will be given to the curvilinear segments of rope between the friction wheels. The vibrations arising from this and similar causes will be very observable in the line of rails parallel to that on which the train is in motion; the maintenance of these vibrations is a fruitless expenditure of power. An exact illustration exists in the endless bands used for communicating motion in steam weaving and steam printing, and even in common knife-grinders' machines; the most casual observer must have noticed the rapid vibrations of the bands in these cases. The motion of the tow-ropes of river barges affords another example of these vibrations. From this cause, also, among others, steam-tugs tow vessels more efficiently when closely and rigidly lashed to their sides than when connected by a long rope; and a garden roller is moved over a rough gravel path more easily by pulling the handle than by pulling a long rope fastened to the handle. This last illustration suggests an experiment worth making, and easily made, by which the subject would be elucidated far more clearly than by written explanation. The alternate retardation and acceleration of the train will have another effect which is due to the elasticity and weight of the rope—viz., that at each retardation the tension of the rope will be slightly increased, and at each acceleration diminished; the consequent stretching and unstretching is maintained by force, which contributes nothing to the motion of the train.

2. In considering the application of steam power by atmospheric pressure, it will be necessary to remove a very common error which supposes that power is in some way gained by the intervention of the air. Now, to refute this notion, it seems sufficient to state the general theorem that "power is not gained, but only transferred by machinery;" or, taking the most favourable case that could possibly exist—viz., that the exhaustion of air should be perfect, and effected by apparatus perfectly air tight, and without friction, it may be seen that whatever pressure exists on that end of the locomotive piston opens to the air can only arise from, and will be exactly equivalent to, the power exerted in removing a corresponding pressure from the other end of the piston, so that even in this hypothetical case, power would not be gained but merely transferred. But it will be shown that in practice the amount of power actually transferred is much less than that expended. The causes of the loss are many; among them are the friction and leakage of the locomotive piston in traversing the whole length of the tube, and the friction and leakage of the air-pumps. But these are trivial compared with the enormous waste owing to leakage in the fissure extending along the top of the tube; and this cause will operate after every precaution has been employed. The apparatus also for closing this fissure will require and abstract additional power, which contributes nothing to the motion of the train. There is another cause of power being lost, which, as I have never seen it noticed, I shall discuss at some length—viz., that arising from the elasticity of the air, and analogous to the effect already alluded to, of the elasticity of a rope, where that means of traction is employed. To determine more precisely the nature of the waste of force in atmospheric railways from the cause under consideration, we will imagine an atmospheric pressure of (suppose) 10 lbs. to the square inch on the locomotive piston necessary to overcome the inertia of the train, and set it in motion with the requisite velocity. "The elastic force of air at a constant temperature varies inversely as the space it occupies;" or, in other words, the pressure increases in proportion as the air is rarefied, and increases in proportion as the air is condensed. Now to produce a pressure of 10 lbs. to the square inch on one end of the moving piston, we must (taking the ordinary atmospheric pressure at 15 lbs.) diminish the elastic pressure in the tube of rarefied air till it amount to only 5 lbs. on the square inch; that is, the air in a tube some three miles long, must be rarefied five-fifteenths or one-third its original density before the train can be put in motion. And the force requisite for this purpose contributes nothing, be it remembered, to the subsequent motion of the train, since to maintain its motion the pumps must continue to be worked exactly as if this preliminary exhaustion had not been effected, for otherwise the advance of the piston would soon condense the air again. It may be considered that we have overestimated the loss of power in stating that "the preliminary exhaustion contributes nothing to the subsequent motion of the train." It may be urged that the amount of pressure necessary to merely put the train in motion is much less than that necessary to maintain its full velocity. In practice, however, the train is never started till a great proportion of the exhaustion has been effected, and before the train has performed but a very small part of its journey the maximum exhaustion is effected. Moreover, up to that point the waste of power will continue to operate—though of course not in so great a degree as when the train is at rest, and disdaining as the velocity increases—for this reason, that until the full speed is attained, the vacuum increases in degree, and is, therefore, carried on with greater rapidity than corresponds to the more progression of the train. We must explain what is meant by "rapidity of exhaustion corresponding to the velocity of the train." When the exhaustion has reached that degree which is to be maintained without increase or diminution throughout the journey, the train will also reach its full speed. It will follow, therefore, that while the degree of exhaustion remains unaltered, for every foot which the motive piston advances along the air tube a quantity of air equal to that contained in one foot of the air tube will be pumped out by the engine. If this exact correspondence in the rate of pumping the air, and of the motion of the train were maintained, the degree of exhaustion would not remain unaltered. If the air were pumped out more slowly than the motion of the propelling piston required, the air would tend to condense, and vice versa. Of course in this explanation the supposition of leakage is excluded. The elasticity of the air affords a reservoir of force which, towards the end of the journey, would keep the train in motion for some little time after the pumps ceased to be worked. This circumstance might be considered as some offset against our estimate, but then the train is never in motion allowed to cease to and gradually, but is stopped by the [illegible] levels. On the whole, therefore, the amount of [illegible] to be almost exactly that above estimated. [illegible] nearly occupying every part of the air tube, [illegible] leakage, the air-pumps must, before the journey [illegible] a volume of air equal to the solid content of [illegible]

force of this back of air constitutes nothing to the motion of the train. We may, therefore, state, without appreciable error, that with the above degree of pressure the preliminary exhaustion wastes two-thirds of the power of the engine. The immediate corollary to this statement is, that the train is propelled most economically with a low degree of exhaustion of the air tube." Supposing the pressure on the propeller to be only 1 lb. instead of 10 lbs. to the square inch, the waste would be but one-tenth of that estimated above—that is to say, one-fifteenth instead of two-thirds of the power of the engine. It must be carefully noted that the friction of the propelling piston is not an *immediate* but an *ultimate* cause of loss of power. For any given diameter of the piston, the necessary degree of exhaustion increases as the resistance to the piston, from friction and other causes, increases. In other words—the amount of this waste is in mathematical language a function of two variables—that is, varies as the resistance to the piston and length of the tube *conjointly*. So much for the waste of power from preliminary exhaustion. Before discussing the next cause of loss of power, we may consider parenthetically another method of propelling railway trains, which, as it has never, I believe, been carried into practice, is only introduced for the purpose of explanation and comparison with existing methods.

3. This third method of traction was based on two hydrostatic principles—that the pressure of water is directly proportional to its depth—and that the pressure is communicated equally in every direction. Hence if a cistern containing water communicate by a tube of any form whatever with a piston fixed in the tube, the pressure will not depend on the quantity of water in the cistern and tube, but solely on the perpendicular altitude of the surface of the water in the cistern above the piston. In the case of the railway, the piston was attached to the train, and was to traverse a horizontal pipe laid along the whole length of the rails. The above law of liquid pressure is, however, laid down on the supposition that the fluid is at rest—when the fluid is *flowing*, the pressure is by no means so great, and diminishes as the velocity increases, a great proportion of the force being absorbed by the mutual action of the fluid molecules, and their friction with the surface of the tube. Hence we come to another important truth—viz., that the laws of fluid pressure are by no means the same for fluids at rest and fluids in motion. This truth applies as well to the atmospheric as hydraulic railway. In the former, a large portion of the atmospheric pressure would be absorbed, and the labour of pumping increased, by the friction of the air with the inner surface of the tube; and this loss will not appear inconsiderable, when we recall some familiar instances of this kind of action. A trumpet is sounded—that is, the whole mass of metal composing it is thrown into a state of rapid vibration by the friction of air. The friction of air in the ocarina forms the greatest resistance to the working of the common bellows. A peg top when spun is brought to rest principally by the action of air—not by resistance of the air in the ordinary acceptation of the phrase (for that would require projecting surfaces), but by the friction of it. A peg top in vacuo has been known to continue spinning an hour and a half. If an inflated bladder have the mouth stopped, and only a small hole pricked in the side, it will take considerable force to drive out the air; the resistance is the friction of the air with the sides of the hole. It is impracticable to light two distinct towns with gas from one gasometer, the gas being obstructed in flowing by its friction with the internal surface of the supply pipe. Excepting this friction of the tubes, the comparison between the hydraulic and atmospheric railways seems greatly in favour of the former. Water being incompressible (nearly so, at least), the loss corresponding to that from "preliminary exhaustion" is avoided in the hydraulic scheme; owing to water being much less mobile than air, the waste from leakage would also be much less. The hydraulic system affords also the convenience of a reservoir of power, for the power stored in the cistern may be employed at any distance of time after the cistern has been filled. The last effect of transferring pressure by the intervention of air which we have to consider, may, like the preceding, be explained by analogy. In considering the rope traction, it was shown that obstacles on the rails would cause a constant stretching and overstretching of the rope, which would give rise to a waste of power. The reader will, on reflection, easily perceive that the same waste occurs in atmospheric traction, only proportionably increased, on account of the exceedingly greater elasticity of the materials by which communication of power is effected.

4. In the fourth mode of traction, that by locomotive engines, the causes of loss of power differ altogether from the preceding—they arise from the power being employed in moving not only the train, but also the enormous additional weight of the engine and tender, which frequently amounts to fifteen tons, also from the occasional slipping of the wheels on the rails.

These, then, are the sources of loss of force in the four methods of railway conveyance. In making, however, an election between them, many other questions besides that of loss of power would have to be taken into account—such as the danger of breaking the rope, where that kind of traction was used; and, on the other hand, the fact that locomotive engines, by the very nature of their action, become inoperative on rails not nearly horizontal. With respect, however, to the mere question of waste of power, there will be no difficulty in determining, from the above consideration, the particular mode of traction in which the loss immeasurably preponderates.

"H. C.," *Civil Engineer.*

New Boiler.—At the British Association, Mr. Fairbairn described a newly invented boiler, which seemed to possess many excellent qualities for the economy of fuel and the prevention of smoke. The boiler was of a very simple construction, of the cylindrical form, and contained two internal flues, about 2 ft. 6 in. diameter, extending the whole length of the boiler. Each flue contained a separate furnace, which, surrounded in every direction by water, formed really a chamber for the earliest heat, as it passed off from the fire. On this plan the gases from both fires were conducted forward through the whole length of the flues to the opposite end, where they unite, and where a new and additional process of combustion takes place. From the description thus given, it would appear that the operations of the double flues were useful in effecting the ignition of the gases as they came in contact respectively from each furnace. The original intention of the double flues and fires was not to lessen the smoke, but to enlarge the steam space, and prevent what is technically called priming in the boiler; it, however, exhibited another properties, and by a simple process of firing the furnaces alternately, the whole phenomena of smoke prevention is accomplished. To effect these objects, it is only necessary to charge the furnaces alternately every half hour, and it will be found, that during the time one fire is replenished with fuel, the other is making gas, and the contents from the other burning fire passing off at a higher temperature than the carbonaceous matter evolved in the newly-charged furnace, the products are ignited the moment they come in contact, and the nuisance of smoke by these simple means prevented.

The Screw Fire Locomotive.—As one of these most valuable conveyances has been just completed in Belfast Lough, and as their erection in the common structures around our country is highly probable, some description may not be uninteresting to our readers, while shoals and sand banks are equally as dangerous as rocks of serious order. It is singular that only a few years past engineers appeared to have dispaired of erecting any substantial beacon on these sandy and shifting foundations; several plans have lately, however, been attempted, and with various success. Those at least are employed on the principle invented by Mr. Mathieu, by which he has conferred a lasting benefit on navigation. The lighthouse under review stands about a mile below Greenville, where the water is seven feet deep at low water mark, simply affording no any marine swell. The present beacon is, in the depth of six feet, laid down sand and gravel, resting on immense blue clay; above piles of three and a half feet circumference are here sunk to the depth of thirteen feet, upon which the superstructure is firmly secured, to form a basis for the erection of the tower; this is a neat building, and intended for a pilot house, and is fitted for this purpose with three convenient sleeping berths, each separate apartments for the captain and his mate, the dioptric lantern hanging of the light, which is on Fresnel's dioptric principle, and was constructed in Paris; it can be seen forty of the miles distance, but it should be mentioned for any of the great lights above the coast. The platform on which the house stands is in the [illegible] feet, while the house is but twenty-six feet—three bedrooms [illegible] and a half feet wide all round, from [illegible] towards setting. The whole expense of this building, including the lighting apparatus, was but 1,800 [illegible] feet in ordinary stone lighthouses; and for the [illegible] of a [illegible] of erecting lighthouses of the [illegible] kind, this mode suggested by Fresnel's genius, [illegible] the [illegible] of the [illegible] the [illegible] of the [illegible] the [illegible] of the